C4 cont.

$(J\ cm^{-3})^{1/2}$ so that the liquid phase exhibits an electrical conductivity of not less than 10 $\mu S\ m^{-1}$ at 1 kHz.

REMARKS

Applicants have amended the claims to more clearly point out and distinctly claim the subject matter that the applicants regard as the invention. Applicants have amended claim 39 to remove the European claim language "preferably." Applicants, with these amendments, do not intend to limit the scope of the claims in any way, and have not added any new matter.

Claim 46 was amended to show its dependency on claim 31.

Claim 38 was amended to include all of the elements in dependent claim 25 for the sole purpose of placing it into a condition of allowance. The scope of the claim has not been limited in any way by this amendment because under 35 USC 112, fourth paragraph, a claim in dependent for is construed to incorporate by reference all of the limitations of the claim to which it refers.

Claim 43 was amended to correct a typo and to change "and geosteering" to "or geosteering" to more clearly point out the subject matter that the applicants regard as their invention. The scope of the claim has not been limited in any way by this amendment.

New claims 55-60 were added.

Support for all of the amendments is located in the specification as filed.

IN RESPONSE TO THE OFFICE ACTION:

REJECTION UNDER 35 USC § 112:

Claims 39 and 46, have been rejected under 35 USC § 112, second paragraph, as allegedly being indefinite. Applicants have amended claim 39 to remove the European claim language "preferably". Applicants, with this amendment, do not intend to limit the scope of the claims in any way, and have not added any new matter.

Additionally, the dependency problem in claims 46 was corrected.

In view of the above, Applicants respectfully request the reconsideration and withdrawal

of the rejection of claims 39 and 46 under 35 USC §112 and ask that the Examiner indicate the allowance of these claims in the next paper from the Office.

FIRST REJECTION UNDER 35 USC § 102:

Claims 22-37, 41, 42, 44-50, 52, and 53 have been rejected under 35 USC §102 as allegedly being anticipated by U.S. Patent No. 5,348,938 issued to Mueller et al. (the Mueller reference). In response, Applicants request that the Examiner reconsider and withdraw the rejection in view of the following:

1. Under US patent law the Courts have ruled that for there to be anticipation under 35 USC § 102, "each and every element" of the claimed invention must be found either expressly or inherently described in a single prior art reference. *Verdegaal Bros. Inc. v. Union Oil Co. of Cal.*, 814 F.2d 1565, 1571; 2 U.S.P.Q.2d 1051, 1053 (Fed. Cir. 1986) and references cited therein. See also *Kloster Speedsteel AB v. Crucible Inc.*, 793 F.2d 1565, 1571; 230 U.S.P.Q. 81, 84 (Fed. Cir. 1986) ("absence from the reference of any claimed element negates anticipation."); *In re Schreiber,* 128 F.3d 1473, 1477; 44 U.S.P.Q.2d 1429, 1431 (Fed.Cir. 1997).

2. The present invention is directed to a water-in-oil emulsion type wellbore fluid which is useful for the electrical logging of a wellbore where the non-aqueous continuous phase is conductive as is recited in the pending claims.

3. In contrast, Mueller is directed to an invert drilling fluid which comprises an alcohol or an alcohol and ester. Mueller also teaches that the alcohols should be largely water-insoluble or essentially water-insoluble. See Col. 3, ll. 56-58. The solubility of the alcohols in the oil phase is below 5% by weight and preferably not more than about 0.5% by weight. Col. 6, ll. 22-28. Alcohols with such low levels of water solubility do not impart adequate conductivity to the invert fluid. The fluids of the present invention are not limited to water-insoluble alcohols.

Mueller does not teach that the fluid is conductive, or is useful for the electrical logging of wells. Mueller teaches that an oleophilic basic amine is used. The examples use diethanolamine, which does not have any effect on conductivity. The present invention uses ionic compounds like quaternary ammonium compounds, to produce conductivity along with the polar organic liquid. Therefore, Mueller does not disclose the electrical logging element, and thus does not anticipate claim 22 under 35 USC § 102 because "each and every element" as

required in *Verdegaal* has not been disclosed. Thus, because dependent claims 23-37, 41 and 42 contain the elements of claim 22, they also are not anticipated by Mueller.

In view of the above, Applicants respectfully request the reconsideration and withdrawal of the rejection of claims 22-37, 41, 42, 44-50, 52, and 53 under 35 USC §102 and ask that the Examiner indicate the allowance of these claims in the next paper from the Office.

SECOND REJECTION UNDER 35 USC § 102:

Claims 22, 25, 26, 28, 29, 31-34, 37, 41, 42, 44-47, 52, and 53 have been rejected under 35 USC §102 as allegedly being anticipated by U.S. Patent No. 5,141,920 issued to Bland et al. (the Bland reference). In response, Applicants request that the Examiner reconsider and withdraw the rejection in view of the following:

1. In the interest of brevity, please refer to the discussion of anticipation under 35 USC § 102 in the prior section.

2. The present invention is directed to a water-in-oil emulsion type wellbore fluid which is useful for the electrical logging of a wellbore where the non-aqueous continuous phase is conductive as is recited in the claims amended in this response.

3. In contrast, the external (continuous) phase of the Bland fluids is essentially non-conductive because the salts are in the discontinuous phase. (See Col. 4, ll. 60-68.) Applicant's independent claim 22 teaches that the continuous phase is conductive. Also, the external phase of Bland is a cloud point glycol that is insoluble in water during the spotting or drilling operation, but has to become water soluble (i.e. water dispersible) when discharged in sea water. This places restrictions on the chemical nature of the glycol and on the salinity of the brine phase. The fluid requires a high salinity (i.e. saturated) brine phase. With a high salinity or saturated brine phase (i.e. low water activity), the external phase becomes highly dehydrated. The water activity imbalance dictates that all water molecules migrate to the brine phase. The complete dehydration of the external phase means that it will be substantially non-conductive. By contrast, the present invention does not have any restriction son brine salinity. Additionally, Bland teaches the use of glycols of high molecular weight (250-1000 in claim 2). Larger glycols do not have adequate polarity to assist in the conductivity. In summation, Bland does not disclose the conductivity

element, and thus does not anticipate claims 22 and 42, under 35 USC § 102 because "each and every element" as required in *Verdegaal* has not been disclosed. Thus, because dependent claims 25, 26, 28, 29, 31-34, 37, 41, 44-47, 52, and 53 contain the elements of claim 22, they also are not anticipated by Bland.

In view of the above, Applicants respectfully request the reconsideration and withdrawal of the rejection of claims 22, 25, 26, 28, 29, 31-34, 37, 41, 42, 44-47, 52, and 53 under 35 USC §102 and ask that the Examiner indicate the allowance of these claims in the next paper from the Office.

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Applicants hereby authorize the Commissioner to charge $ 276.00 (2 new independent claims and 6 new dependent claims) to the Deposit Account No. 01-2508, referencing Order No. 11836.0689.PCUS00. Applicants' representative hereby authorizes the Commissioner to charge any additional fees which may be required, or credit any overpayment, to the Deposit Account No. 01-2508, referencing Order No. 11836.0689.PCUS00.

Applicants hereby petition for any extension of time that may be deemed necessary to further the prosecution of this application. Applicants' representative hereby authorizes the Commissioner to charge any additional fees which may be required, or credit any overpayment, to the Deposit Account No. 01-2508, referencing Order No. 11836.0689.PCUS00.

In order to facilitate the resolution of any issues or questions presented by this paper, Applicants respectfully request that the Examiner directly contact the undersigned by phone to further the discussion, reconsideration and allowance of the claims.

In order to promote the prosecution of this application, the Examiner is hereby authorized to contact the undersigned by electronic mail. Please address all e-mail to: whitec@howrey.com.

CLAIMS SHOWING AMENDMENTS

38. (Twice Amended) A wellbore fluid of the water-in-oil emulsion type comprising a discontinuous aqueous or brine phase, solids, a water immiscible organic liquid OL, and having a non-aqueous continuous liquid phase that comprises a polar organic liquid POL which exhibits a dielectric constant of at least about 5.0 and a Hildebrand Solubility Parameter of at least about 17 $(J\ cm^{-3})^{1/2}$ so that the liquid phase exhibits an electrical conductivity of not less than 10 $\mu S\ m^{-1}$ at 1 kHz, wherein the non-aqueous liquid phase further comprises a dissolved component (DC) selected from: water; inorganic salts wherein the anion(s) is (are) a conjugate base of an acid whose dissociation constant (pK_a) in water at 298 °K is less than about 1.0, and the cation is ammonium ion or a metal ion which has an ionic radius of less than about 2/3 of the ionic radius of the pre-selected anion; quaternary ammonium salts or hydroxides; N-alkyl pyridinium salts or hydroxides; and organic bases exhibiting a pK_a in water at 298 °K of more than 10.0, and their salts, ~~A wellbore fluid as in claim 25 wherein it~~ further ~~comprises~~ comprising a dispersion in the wellbore fluid of finely divided particles of an electrically conducting solid insoluble in the organic liquid or water.

39. (Twice Amended) A wellbore fluid as in Claim 38 wherein the finely divided electrically conducting solid is selected from the group consisting of metals; carbon ~~preferably~~ in the form of graphite or carbon fibre; metal coated carbon fibre or graphite; and conductive polymers.

43. (Twice Amended) A method of providing enhanced information from electrical logging tools, measurement while drilling, logging while drilling, or ~~and~~ geosteering wherein the efficiency is enhanced by the improved electrical conductivity of a ~~of the~~ water-in-oil type emulsion comprising a discontinuous aqueous or brine phase, solids, and having a non-aqueous continuous liquid phase that comprises a polar organic liquid POL which exhibits a dielectric constant of at least about 5.0 and a Hildebrand Solubility Parameter of at least about 17 $(J\ cm^{-3})^{1/2}$ so that the liquid phase exhibits an electrical conductivity of not less than 10 $\mu S\ m^{-1}$ at 1 kHz.

46. (Amended) A wellbore fluid as in Claim ~~25~~ 31, wherein the alkane sulphonic acids are selected from the group consisting of sulphonic acid and ethane sulphonic acid; the arene

CLAIMS SHOWING AMENDMENTS

sulphonic acids are selected from the group consisting of benzene sulphonic acid and naphthalene sulphonic acid; and the alkane and arene sulphonic acids substituted with electron-withdrawing groups are selected from the group consisting of trifluoromethane sulphonic acid and 2,4-dinitrobenzene sulphonic acid, picric acid, and trichloracetic acid.

Please add the following new claims:

55. (New) The method in claim 43 wherein the polar organic liquid POL is one or more selected from the group consisting of alcohols, phenols, glycols, polyalkylene glycols, mono alkyl or mono aryl ethers of glycols, mono alkyl or mono aryl ethers of polyalkylene glycols, monoalkanoate esters of glycols, monoalkanoate esters of polyalkylene glycols, ketones possessing also hydroxyl group(s), diketones.

56. (New) The method in claim 43, wherein the polar organic liquid POL component is selected from the group consisting of:

- aliphatic and alicyclic alcohols of carbon numbers C_5-C_{10};
- phenols;
- glycols;
- polyalkylene glycols;
- mono-alkyl or mono-aryl ethers of glycols or polyalkylene glycols;
- diacetone alcohol (4-hydroxy-4-methyl-1,2-pentanone); acetylacetone; acetonylacetone.

57. (New) The method in claim 43, wherein the polar organic liquid POL is an aprotic solvent.

58. (New) The method in claim 43 wherein the non-aqueous liquid phase further comprises a dissolved component (DC) of inorganic salt comprising anions which are the conjugate base of an acid selected from the group consisting of hydrochloric acid; hydrobromic acid; hydroiodic acid; thiocyanic acid; perchloric acid; nitric acid; permanganic acid; sulphuric acid; alkane

CLAIMS SHOWING AMENDMENTS

sulphonic acids; arene sulphonic acids; alkylaryl sulphonic acid; alkane and arene sulphonic acids substituted with electron-withdrawing groups.

59. (New) The method in claim 43 further comprising an organic base wherein the organic base(s) exhibits a pK_a in water of more than 10.0 and is selected from the group consisting of mono-, di-, and tri-alkylamines wherein the alkyl groups contain from 2 to 18 carbon atoms; alkylpiperidines; alkylpyrrolidines; N-alkylated ethyleneamines; and their salts.

60. (New) A method of logging while drilling using a water-in-oil type emulsion with increased conductivity comprising a discontinuous aqueous or brine phase, solids, and having a non-aqueous continuous liquid phase that comprises a polar organic liquid POL which exhibits a dielectric constant of at least about 5.0 and a Hildebrand Solubility Parameter of at least about 17 $(J\ cm^{-3})^{1/2}$ so that the liquid phase exhibits an electrical conductivity of not less than 10 $\mu S\ m^{-1}$ at 1 kHz.

Respectfully submitted,

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